

DETAILS OF THE WEATHER IN THE UNITED STATES

GENERAL CONDITIONS

The pressure distribution over the northeast Pacific was close to normal up to about the 24th with the continental extension of the North Pacific statistical anticyclone rather more intense than usual over the Great Basin region. During the last week of the month this anticyclone gave way both over the ocean and the continent and several much-needed rainstorms prevailed over central and northern California. On p. 2 of this REVIEW MR. T. R. Reed, of the San Francisco Weather Bureau Office, gives the mean pressure distribution over the Pacific leading up to the rains above mentioned.—A. J. H.

CYCLONES AND ANTICYCLONES

By W. P. DAY

While abnormally low air pressures were being recorded over the North Pacific in the vicinity of the Aleutian Islands and in northern and western Alaska during January, an apparently compensating excess of pressure occurred along the Pacific coast south of Alaska. High pressure was persistent over the Pacific States and the Plateau region, except near the middle of the month and again near the end. With this general distribution of pressure, nearly half of the lows plotted were of the Alberta type, 10 out of a total of 22. However, four lows which developed over the south and southwest were more important as storms, the Alberta type generally giving rather light precipitation.

The six HIGHS from the Canadian interior were of moderate proportions and most of them moved rapidly. Thirteen HIGHS were plotted, which is about normal.

FREE-AIR SUMMARY

By V. E. JAKL

It will be noted at once from the departures on Table 1 that free-air temperatures were lower than normal over the southern stations and higher than normal over the northern. This is in agreement with the distribution of departures for the surface over corresponding portions of the country as shown by Chart III, this Review. Ellendale and Drexel were above normal, Broken Arrow, Due West, and Groesbeck below normal, and Royal Center approximately normal. The departures were largest at Ellendale, where the excess over normal was especially evident in the lower levels, diminishing thence upward. Over Drexel the departures also diminished with altitude, while elsewhere there was a tendency for a perceptible increase in the deficiency in temperature with altitude, indicating a stronger average lapse rate at all stations than normal.

The resultant winds, as given in Table 2, apparently show no decided relation to the departures in temperature, that is, the southern stations do not show an excess—nor the northern stations a diminution—of northerly component as compared with the normal, such as might be expected from the temperature record.

This is plainly evident in the wind record for Ellendale, where the resultants are almost identical with the normal. For example, in the record of the 28th–29th (see following table) it will be noted that the greatest change to warmer on the 29th from the relative low temperatures on the 28th occurred at those levels where the wind direction changed from southerly to one having a northerly component. This change was typical of a condition that repeated itself a number of times during the month at Ellendale, in which the southerly winds in the rear of a cold HIGH were replaced by westerly to north-westerly winds in the south and southwest portion of a relatively warm LOW approaching rapidly from the northwest or west-northwest. The pronounced character of this change at Ellendale was, moreover, emphasized by the fact that the minimum surface temperature on the 28th, -26.7° , was the lowest of the month, and the maximum surface temperature on the 29th, 10° , lacked only about a degree of being the highest of the month. It will be seen by the record of temperature at 750 meters on the 29th that it was necessary for insolation to warm the lowest layers only to the extent of heating the surface to the potential temperature that prevailed 300 meters higher up, in order to reach a maximum surface temperature even greater than that actually observed.

Altitude m. s. l.	Jan. 28		Jan. 29	
	Temperature	Wind direction	Temperature	Wind direction
<i>Meters</i>	$^{\circ}\text{C.}$		$^{\circ}\text{C.}$	
444 (surface).....	-22.5	S.....	-10.0	SSW.
500.....	-22.3	S.....	-6.8	SW.
750.....	-21.8	SSW.....	7.8	NW.
1,000.....	-19.7	SSW.....	6.1	NW.
1,500.....	-12.7	SW.....	2.6	WNW.
2,000.....	-11.2	WSW.....	1.3	W.
2,500.....	-8.6	W.....	-1.0	W.
3,000.....	-10.2	NW.....		

Wind directions aloft were on the whole principally west, except that over the northern plains States they were northwest at all altitudes. Also over the north-eastern portion of the country there was a well defined tendency for the winds to become northwesterly at altitudes of 3,000 meters and above. Velocities averaged higher than normal, a fact apparently associated with the rapid movement of HIGHS and LOWS that featured the month. Strong winds aloft were particularly in evidence from the 26th to 28th, when winds of 30 to 40 meters per second from west to northwest were recorded at various altitudes at Broken Arrow, Drexel, Due West, Ellendale, Groesbeck, Ithaca, Lansing, Royal Center, and Washington. The tendency to an unusually strong drift in a general west to east direction during the month was also evidenced by the rare occurrence of winds of even moderate depth having an easterly component. The only instance of easterly winds to any comparatively high altitude occurring over an extended area was observed on the 8th, when, in connection with a HIGH that overlay the lower Lake region and New England States, winds having a decided component from the east to depths ranging from 3,000 to 4,000 meters were observed at Ithaca, Lansing, and Royal Center.